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EXAMINER

SUCH, MATTHEW W

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/523,216	<b>Applicant(s)</b> CLEMENS ET AL.	
	<b>Examiner</b> Matthew W. Such	<b>Art Unit</b> 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 2-15 and 17-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-15 and 17-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 January 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                      |                                                                   |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____                                                          | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. The restriction requirement as set forth in the Office action mailed on 14 March 2008 is hereby withdrawn. In view of the withdrawal of the restriction requirement as to the rejoined inventions, applicant(s) are advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application. Once the restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

### ***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Drawings***

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Reference sign "5" is not in Figure 7 as described by Applicant's specification (see Para. [00020] on Page 6) and Reference sign "5" is not in Figure 8 as described by Applicant's specification (see Para. [00022] on Page 7). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply

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to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Specification*

4. The abstract of the disclosure is objected to because the phrase "Figure 4" in the Abstract should be removed and a period is missing from the end of the first sentence of the specification. Additionally, the Abstract must be a single paragraph. Appropriate corrections are required. See MPEP § 608.01(b).

5. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The specification does not provide any description of the following substrate materials that were present in the originally filed claims (claim 11): PP, PEN, polyimide, polyamide, and coated paper.

6. The disclosure is objected to because of the following informalities: there is a period missing at the end of the first sentence. Appropriate correction is required.

***Claim Objections***

7. Claim 3 is objected to because of the following informalities: the phrase "pedot" in Line 4 should read "PEDOT" since it is an abbreviation. Appropriate correction is required.

8. Claim 9 is objected to because of the following informalities: the phrase "the first organic functional layer" in Line 4 should read "the organic functional layer". Appropriate correction is required.

9. Claim 12 is objected to because of the following informalities: the phrase "through-plating" bridging Lines 1-2 should read "through plating"; the phrase "the first layer" in Line 4 and twice in Line 5 should read "the first lower layer". Appropriate correction is required.

10. Claim 17 is objected to because of the following informalities: the phrase "the first layers" in Line 3 should read "the first plurality of layers"; the phrase "the lower layer" in Line 6 should read "the first lower layer"; the phrase "second plurality of layers" in Line 10 should read "the second plurality of predominantly organic functional layers". Appropriate correction is required.

11. Claim 21 is objected to because of the following informalities: the phrase "second plurality of layers" in Line 2 should read "the second plurality of predominantly organic functional layers". Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

12. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

13. Claims 2-3 and 14-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not disclose the combination of elements including the disruption element and the truncated conical cross-section profile of the through plating. The truncated conical cross-section profile of the through plating is disclosed in the embodiment of Figures 1-7 which does not have the disruption element. The disruption element is disclosed in the embodiment of Figure 8, which does not show the truncated conical cross-section profile of the through plating.

14. Claim 5 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not disclose the combination of elements including the disruption element

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and the rough surface of the through plating. The rough surface of the through plating is disclosed in the embodiment of Figures 1-7 which does not have the disruption element. The disruption element is disclosed in the embodiment of Figure 8, which does not show rough surface on the through plating.

15. Claim 23 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. As currently written, claim 23 adds in a third plurality of layers that the through plating extends through. However, such language has introduced more layers into the device than are disclosed by the specification. The previous claim 17 requires a first plurality of layers, which includes a second plurality of predominantly organic functional layers and the first plurality of layers includes a first lower layer (Element 2 in Fig. 4, for example) and a central layer (Element 4 for example). The specification only discloses one more layer (Element 5, for example) that the through plating (Element 3) extends through. Since the claim uses the language of "a third plurality", this requires more than one additional layer, such as two layers. One layer is disclosed (Element 5, for example), but a second layer is not disclosed.

16. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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17. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites the limitation "the electronic component" in Line 1. There is insufficient antecedent basis for this limitation in the claim. It is unclear what "the electronic component" is referring to, such as some element or limitation from claim 13, or if the use of the phrase "component" is intended to encompass of new element not already recited.

18. Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites "and includes polyaniline, pedot, carbon black, graphite, electrically conducting silver and/or metal and/or a mixture thereof". Such language renders the claim indefinite because it is unclear what the electrically conductive material contains. For proper language to claim Markush groups, see MPEP § 2173.05(h). The claim recites the limitation "the electronic component" in Line 1. There is insufficient antecedent basis for this limitation in the claim. It is unclear what "the electronic component" is referring to, such as some element or limitation from claim 13, or if the use of the phrase "component" is intended to encompass of new element not already recited.

19. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites "includes an electrically non-conducting insulating material wherein at least one of the plurality of layers and the non-conducting material is selected from



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the group consisting of polyhydroxystyrene, polymethylmethacrylate and/or polystyrene and/or a semiconducting material including polyalkylthiophene and/or polyfluorene and/or a mixture thereof". Such language renders the claim indefinite because it is unclear what is actually being claimed. For proper language to claim Markush groups, see MPEP § 2173.05(h). The claim recites the limitation "the electronic component" in Line 1 and "the component" in Line 2. There is insufficient antecedent basis for these limitations in the claim. It is unclear what "the electronic component" and "the component" are referring to, such as some element or limitation from claim 13, or if the use of the phrase "component" is intended to encompass of new element not already recited.

20. Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites the limitation "the electronic component" in Line 1. There is insufficient antecedent basis for this limitation in the claim. It is unclear what "the electronic component" is referring to, such as some element or limitation from claim 13, or if the use of the phrase "component" is intended to encompass of new element not already recited. The claim recites "which promotes ohmic contacting". However, this recitation renders the claim indefinite because it is unclear what is ohmic contacted.

21. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites the limitation "the electronic component" in Line 1. There is

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insufficient antecedent basis for this limitation in the claim. It is unclear what "the electronic component" is referring to, such as some element or limitation from claim 13, or if the use of the phrase "component" is intended to encompass of new element not already recited. The claim recites "wherein the disruption element manifests a chemical treatment". However, this recitation renders the claim indefinite because it is unclear what "manifests" is.

22. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites the limitation "the lower functional layer" in Line 3. There is insufficient antecedent basis for this limitation in the claim. The claim recites "wherein the disruption element manifests a physical treatment". However, this recitation renders the claim indefinite because it is unclear what "manifests" is.

23. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites the limitation "the electronic component" in Line 1. There is insufficient antecedent basis for this limitation in the claim. It is unclear what "the electronic component" is referring to, such as some element or limitation from claims 2-5, or if the use of the phrase "component" is intended to encompass of new element not already recited.

24. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the

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invention. The claim recites the limitation "the electronic component" in Line 1. There is insufficient antecedent basis for this limitation in the claim. It is unclear what "the electronic component" is referring to, such as some element or limitation from claims 2-5, or if the use of the phrase "component" is intended to encompass of new element not already recited. The claim recites "wherein the disruption element manifests a locally restricted change in the surface energy". However, this recitation renders the claim indefinite because it is unclear what "manifests" is.

25. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites the limitation "the electronic component" in Line 1. There is insufficient antecedent basis for this limitation in the claim. It is unclear what "the electronic component" is referring to, such as some element or limitation from claim 13, or if the use of the phrase "component" is intended to encompass of new element not already recited.

26. Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites the limitation "the electronic component" in Line 1 and "the component" in Line 2. There is insufficient antecedent basis for these limitations in the claim. It is unclear what "the electronic component" and "the component" are referring to, such as some element or limitation from claim 13, or if the use of the phrase "component" is intended to encompass of new element not already recited. The claim recites the material PP. It is unclear

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what PP is intended to be and the specification provides no description of what the Applicant considers PP to be. For example, PP can be an abbreviation of a number of different materials at least including polypropylene, polypyrrole, polyphthalamide, polyphthalate, etc.

27. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites the limitation "the forming of a first layer" in Line 4 and Line 6. There is insufficient antecedent basis for this limitation in the claim. The claim recites "at least a second portion of layers are ohmically intercoupled by the through plating". However, this recitation renders the claim indefinite because it is unclear what a second portion of layers are ohmically intercoupled to. The recitation of "a majority of which layers are predominantly organic material and include..." renders the claim indefinite because it is unclear what "a majority" is and whether layers not in this "majority" also include the an insulating layer, first layer, subsequent layers, disruption element, void, and through plating.

28. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites "a plurality of layers on the first layer and overlying the disruption element on the first layer" and "the disruption element being arranged to result in a void in a second portion of the plurality of layers in the area above the disruption element". However, these two conditions appear to be mutually exclusive from one another. It is unclear how the plurality of layers can overlie the disruption element at the same time that a void in the

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area above the disruption element is present. The claim recites the limitation "at least two of the layers" in Line 11. There is insufficient antecedent basis for this limitation in the claim. It is unclear which of the previously recited layers, such as "the first layer" or the "plurality of layers" the recitation of "the layers" is intending to refer to.

29. Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites the limitation "the layers" in Line 2. There is insufficient antecedent basis for this limitation in the claim. It is unclear which of the previously recited layers, such as "the first plurality of layers" or the "second plurality of predominantly organic functional layers" or "the first layers" or the "lower layer" or the "central layer" or the "second plurality of layers" the recitation of "the layers" is intending to refer to.

30. Claim 23 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites the limitation "said layers" in Line 4. There is insufficient antecedent basis for this limitation in the claim. It is unclear which of the previously recited layers, such as "the first plurality of layers" or the "second plurality of predominantly organic functional layers" or "the first layers" or the "lower layer" or the "central layer" or the "second plurality of layers" or the "third plurality of layers" the recitation of "said layers" is intending to refer to.

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***Claim Rejections - 35 USC § 102***

31. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

32. In so far as definite, claim 12 is rejected under 35 U.S.C. 102(e) as being anticipated by Sirringhaus ('669). Sirringhaus teaches a process of producing at least one through-plating by forming a plurality of layers (Elements 37, 36, 35, 34, etc.; Fig. 14). The layers are organic material and including insulating layers (Col. 17, Lines 20-40, for example). The first lower layer is conductive (Element 37; Fig. 14) subsequent layers (Elements 36, 35, 34; Fig. 14) are deposited thereon. A disruption element solvent material is formed on the first lower layer that opens the insulating layers up into a void, which is filled by a through plating that is ohmically coupled to the first lower layer (Col. 17, Lines 20-40, for example). Regarding the language of "to result", the examiner notes that such language merely recites an intended outcome or result of the positively recited method step of "forming a disruption element". The examiner notes recitations directed to the intended use/outcome/result of a specific step in a method claim does not narrow scope of the method claim past the specific recited step. See MPEP § 2106 II C and MPEP § 2111.04. As such, the claim as currently written does not actually require "forming" a void, but merely requires "forming a disruption element".

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33. In so far as definite, claim 12 is rejected under 35 U.S.C. 102(e) as being anticipated by Sirringhaus ('040). Sirringhaus teaches a process of producing at least one through-plating by forming a plurality of layers (Elements 1, 2, 3, 4, 5, 7, etc.; Fig. 14 and Elements 25, 26, 27, 28, 29; Figs. 12-13). The layers are organic material and including insulating layers (Cols. 17-19, for example). The first lower layer is conductive (Element 3; Fig. 14 and Element 25, 26; Figs. 12-13) subsequent layers (Elements 4, 5, 7; Fig. 14 and Elements 27, 28; Figs. 12-13) are deposited thereon. A disruption element solvent material is formed on the first lower layer that opens the insulating layers up into a void, which is filled by a through plating that is ohmically coupled to the first lower layer (Cols. 17-19, for example). Regarding the language of "to result", the examiner notes that such language merely recites an intended outcome or result of the positively recited method step of "forming a disruption element". The examiner notes recitations directed to the intended use/outcome/result of a specific step in a method claim does not narrow scope of the method claim past the specific recited step. See MPEP § 2106 II C and MPEP § 2111.04. As such, the claim as currently written does not actually require "forming" a void, but merely requires "forming a disruption element".

### ***Claim Rejections - 35 USC § 103***

34. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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9. In so far as definite, claims 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drury ('024) in view of Schmidt ('881).

The examiner notes that the language of "a first plurality of layers including a second plurality of predominately organic functional layers at least one of the first [plurality] layers is a first lower layer and at least one other of the first plurality of layers is a central layer" amounts to only requiring "a first lower layer" and "a central layer" which are "predominantly organic functional layers". This is because the language of "a first plurality of layers including a second plurality of predominately organic functional layers" merely amounts nomenclature that does not add any addition limitations to the claim other than that "a first plurality of layers" are "predominantly organic functional layers". The claim then identifies that the first plurality of layers has a "a first lower layer" and "a central layer". Therefore, these are the only elements required by such language.

Drury teaches an electronic component comprising a plurality of layers (Elements 3, 4, 5, 6, for example) that are organic functional layers (Col. 2, Lines 17-23, at least). At least of the plurality of layers is a lower layer (such as Element 3 or 4, or Element 5 if viewed upsidedown, for example) and at least one of the other layers is a central layer (any of the Elements 3, 4, 5, 6 not already selected) and an upper layer (any additional of Elements 3, 4, 5, 6 not already selected). A least one through plating (Element 104) extends from a lower layer through at least the central layer and the through plating as a conical cross-sectional profile (see Figure 4, for example). The through plating is electrically conductive (Col. 4, Line 63, for example) and is ohmically coupled to the at least two layers (Col. 3, Lines 28-39, for example). The through plating decreases in diameter from the lower layer to the upper layer (see Figure 4, when held



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upsidedown, for example). The through plating is hollow (see Figure 4, for example). While Drury explains that the shape of the intersection between the through contact and layers it contacts should be made large to decrease contact resistance (Col. 2, Lines 30-56, for example), there is no explicit disclosure that the conical cross-section of Drury is truncated.

Schmidt teaches truncated conical cross-sectional through platings (Elements 11, 11'; Figure 2g, for example). It would have been obvious to one of ordinary skill in the art at the time the invention was made to truncate the conical cross-section of Drury as taught by Schmidt in order to increase the surface area of the contact interface, thereby reducing contact resistance (see, for example, Schmidt Col. 4, Lines 28-31 and Drury Col. 2, Lines 30-56).

10. In so far as definite, claims 17-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sirringhaus ('669) in view of Schmidt ('881).

The examiner notes that the language of "a first plurality of layers including a second plurality of predominately organic functional layers at least one of the first [plurality] layers is a first lower layer and at least one other of the first plurality of layers is a central layer" amounts to only requiring "a first lower layer" and "a central layer" which are "predominantly organic functional layers". This is because the language of "a first plurality of layers including a second plurality of predominately organic functional layers" merely amounts nomenclature that does not add any addition limitations to the claim other than that "a first plurality of layers" are "predominantly organic functional layers". The claim then identifies that the first plurality of layers has a "a first lower layer" and "a central layer". Therefore, these are the only elements required by such language.

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Sirringhaus teaches an electronic component comprising a plurality of layers (Elements 34, 35, 36, 37; Fig. 14) that are "predominately" organic functional layers (Col. 17, Lines 20-40, at least). At least of the plurality of layers is a lower layer (such as Element 36) and at least one of the other layers is a central layer (such as Element 35) and a lower layer (Element 37) an upper layer (Element 34). The lower layer and upper layer can be a third plurality of layers. A least one through plating (Element 38) extends from a lower layer through at least the central layer. The through plating is electrically conductive (Col. 17, Line 26) and is ohmically coupled to the at least two layers since the conductive materials can be PEDOT or metals. The through plating is solid (see Figure 14). Sirringhaus does not teach that there is a truncated canonical cross-section decreasing in diameter from the lower layer up through an upper layer.

Schmidt teaches truncated conical cross-sectional through platings (Elements 11, 11'; Figure 2g, for example). It would have been obvious to one of ordinary skill in the art at the time the invention was made to truncate the conical cross-section of Sirringhaus as taught by Schmidt in order to increase the surface area of the contact interface, thereby reducing contact resistance (see, for example, Schmidt Col. 4, Lines 28-31 and Drury Col. 2, Lines 30-56).

35. In so far as definite, claims 4, 6-11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami ('066) in view of Drury ('024).

Regarding claims 4, 6-10 and 13, Murakami teaches a first layer (Element 2, 3) of functional organic material, such as a silver paste (Col. 5, lines 55-60) and a disruption element of a physically or chemically roughened portion (Element ▲▲▲▲). A first portion (Element 7) of layers comprising predominantly organic material, such as an epoxy is formed above the first

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layer of functional organic material. A through plating (Element 9) is in void in the organic material (Figs. 1H, 2G, 3H, for example).

The Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP §2114. The recitation of “for forming an electrical interconnection to at least two of the layers” does not distinguish the present invention over the prior art which teaches the structure as claimed teaches an ohmic electrical connection between the first layer and through plating.

Murakami teaches an organic insulating material of epoxy (Element 7), but does not disclose the specific material of polyhydroxystyrene (which is polyvinylphenol), and also discloses a semiconductor (Element 8), but does not disclose the specific material of polyalkylthiophene. However, Drury discloses an electrical component in which several of the layers are made of organic material including an insulator (Element 5) of polyvinylphenol (Col. 2, Lines 15-16) and an organic semiconductor (Element 4) of polythiophene (Col. 2, Line 21). It would have been obvious to a person of ordinary skill in the art at the time of the invention to have used organic materials as taught by Drury in the product of Murakami so as to provide solution processable materials which can be applied through spin-coating as well increasing the functionality of the device. Specifically, Drury teaches that polyvinylphenol (polyhydroxystyrene) is a good insulator (Col. 2, Lines 15-16). Furthermore, polyalkylthiophene

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is a conventional polythiophene organic semiconductor material known to possess excellent electrical properties.

Regarding claim 11, Murakami teaches a substrate (Element 1) which is a circuit board, but does not teach that the substrate is a plastic of PET, PP, PEN, polyimide, polyamide, or coated paper. However, Drury teaches that a substrate can be polyamide (Col. 2, Line 25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use polyamide as the substrate since it is a functionally equivalent material useful for substrates that provide support to electronic element formed thereon.

It has been held that the selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

The language, term, or phrases "arranged to result in a void in a second portion of the plurality of layers" (claim 13), "manifests a physical treatment" (claim 6), "manifests a chemical treatment" (claim 7), and "manifests a locally restricted change in surface energy..." (claim 9), "provides a residue on the first layer, at which prior to or after application of the plurality of layers, the disruption element is detectable..." (claim 10) are directed towards the process of making a void. It is well settled that "product by process" limitations in claims drawn to structure are directed to the product, per se, no matter how actually made. In re *Hirao*, 190 USPQ 15 at 17 (footnote 3). See also, In re *Brown*, 173 USPQ 685; In re *Luck*, 177 USPQ 523; In re *Fessmann*, 180 USPQ 324; In re *Avery*, 186 USPQ 161; In re *Wethheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); In re *Marosi et al.*, 218 USPQ 289; and

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particularly In re *Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or otherwise. The above case law further makes clear that applicant has the burden of showing that the method language necessarily produces a structural difference. As such, the language "arranged to result in a void in a second portion of the plurality of layers" (claim 13), "manifests a physical treatment" (claim 6), "manifests a chemical treatment" (claim 7), and "manifests a locally restricted change in surface energy..." (claim 9), "provides a residue on the first layer, at which prior to or after application of the plurality of layers, the disruption element is detectable..." (claim 10) only requires a void, which does not distinguish the invention from the prior art, who teaches the structure as claimed.

11. Claims 2-3, 5 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami ('066) in view of Drury ('024) as applied to claim 13 above, and further in view of Schmidt ('881).

Murakami does not teach that there is a truncated canonical cross-section in the through plating, nor the materials that it is made from (Element 9).

Schmidt teaches truncated conical cross-sectional through platings (Elements 11, 11'; Figure 2g, for example). It would have been obvious to one of ordinary skill in the art at the time the invention was made to truncate the conical cross-section of Murakami as taught by Schmidt in order to increase the surface area of the contact interface, thereby reducing contact resistance

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(see, for example, Schmidt Col. 4, Lines 28-31 and Drury Col. 2, Lines 30-56). Regarding the material of the through plating, it would have been obvious at the time the invention was made to use metal since metal is highly conductive. It has been held that the selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07. Regarding the surface roughness of the through plating, it would have been obvious at the time the invention was made to form a highly roughened surface since Murakami teaches that this surface form improved bonds and contacts (Col. 5, Lines 32-40 and Col. 7, Lines 1-17).

### ***Response to Arguments***

36. Applicant's arguments, see submission, filed 1 August 2008; with respect to the rejection(s) of claim(s) 17-24 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of newly discovered prior art.

### ***Related Prior Art***

37. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Chang ('751) teaches using a disruption element of photoresist to prevent spin on glass from covering conductive traces (see Figures); Liu ('894), Hotta ('180), Brenner ('558) and Okumura ('056) each teach methods of forming interconnects; Kawase ('831 and Adv. Mater., Vol. 13) teaches methods of forming organic circuit using printing techniques.

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***Contact Information***

38. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew W. Such whose telephone number is (571) 272-8895.

The examiner can normally be reached on Monday - Friday 9AM-5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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